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The Veterinary Record

THE OFFICIAL JOURNAL OF THE NATIONAL VETERINARY MEDICAL ASSOCIATION OF GREAT BRITAIN AND IRELAND,
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Office Address: 10 GRAY'S INN SQUARE, W.C.1.

Notices.

CENTRAL DIVISION.

THE following arrangements have been made for the summer meeting of this Division, on Thursday, July 9th, to which ladies are invited.

Char-a-bancs will leave 10 Red Lion Square, W.C., at 2 p.m. for Henley, where tea will be provided at The Red Lion Hotel. The return journey from Henley to Maidenhead will be by steam launch, and from Maidenhead back to London by Char-a-banc.

The cost is expected to amount to 14s. per head, but to some extent depends on the number going.

Will Fellows intending to be present, kindly notify the Hon. Secretary not later than July 3rd, and at the same time state the number of their visitors.

J. F. MACDONALD,
185, Upper Richmond Road, S.W.15.

WESTERN COUNTIES' DIVISION.

THE Summer Meeting of this Division will be held on Thursday, July 16th, 1925, at "The Clarence Hotel," Torquay (Torre Station) Devon.

The members with their ladies are kindly invited to luncheon and tea by the President, C. Masson, Esq., M.R.C.V.S.

A demonstration arranged by Professor J. Basil Buxton, M.A., F.R.C.V.S., D.V.H., of Cambridge, of the Intra-dermal Tuberculin Test, will be given. Luncheon at 1 p.m. Meeting at 2 p.m.

AGENDA OF BUSINESS MEETING.

1. Routine.
2. Election of new members.
3. Presidential Address.
4. Discussion on Professional Fees.

R. BARONS NELDER,
Hon. Secretary.

MID-WEST AND SOUTH WALES DIVISION.

THE July Quarterly Meeting will be held on the 17th inst., and will be of a social nature, ladies being especially welcome.

ARRANGEMENTS.

A char-a-banc will leave Newport G.W.R. station at 1-30 p.m. for a trip through the Wye valley and to visit Tintern Abbey.

Tea will be served at the Beaufort Arms, Monmouth, about 4 p.m., at which place business will be transacted and Professor Buxton has kindly promised to give a demonstration of Intra-dermal Tuberculin Testing during the tea interval.

All veterinary surgeons welcome to see demonstration and to tea. Gentlemen will be expected to pay 4s. 6d. for seat in char-a-banc. Ladies will be the guests of Mr. Hobbs and Mr. Robinson, of Newport, during trip, as will the whole company for tea.

Will those who intend being present kindly notify Mr. F. C. Hobbs, M.R.C.V.S., Newport, not later than July 13th, saying if joining the char-a-banc or only present for tea.

J. J. AVESTON, *Hon. Secretary.*

Mallein and Tuberculin.

MEMBERS of the Profession may obtain Mallein and Tuberculin on application to the Principal, Royal Veterinary College, Camden Town, N.W.1, on the following terms: In bottles, 6d. per dose; minimum quantity supplied, two doses. In hermetically sealed tubes containing one dose each (specially suitable for use abroad), 1/- per dose. Concentrated (for the ophthalmic test in sealed tubes, 9d. per dose.

Notices.

WEST OF SCOTLAND DIVISION.

IT is proposed, if the numbers warrant, to hold a meeting of this Division, on the 15th July (the second day of the Highland Agricultural Show) at 2 p.m.

Chars-a-banc to leave corner of West Nile Street and West George Street, at 2 p.m.

Drive to Lenzrie, Wordie and Co.'s farm, where Mr. Jas. Macfarlane, M.R.C.V.S., will demonstrate on several cases of lameness. Thereafter, drive to Campsie Glen, where tea will be served.

Mr. Wm. Roy, M.R.C.V.S., the President, will here read his inaugural address.

Ladies are invited.

Those desirous of being present please communicate with the Secretary at once.

GEORGE W. WEIR, M.R.C.V.S.,
Secretary.

Appointments Required.

ABERDEEN and North of Scotland—Captain Conner, M.R.C.V.S., will be available for Consultant and Locum Tenens duties from this date. Reply 34 Loanhead Terrace, Aberdeen.

VETERINARY SURGEON of large experience, willing to undertake locum for fortnight or longer periods. Moderate fee. Apply V.R. 45, 10 Gray's Inn Square, W.C.1.

VETERINARY Surgeon, Scotch, recently qualified, experienced and reliable, wishes situation as assistant or manager, preferably (but not essentially) with view to succession. Free, beginning of August, or would do a few Locums. Reply, V.R. 160, 10 Gray's Inn Square, W.C. 1.

MANAGER OR LOCUM, experienced practitioner, excellent references, seeks engagement, permanent or temporary. Well up in all branches of practice. Reply V.R. 5, 10 Gray's Inn Square, W.C.1.

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Appointments Vacant.

THE Glasgow Veterinary College (Incorporated).—The Governors invite applications for the post of Lecturer on Pathology, Protozoology and Bacteriology at a salary at the rate of £250 per annum. The appointment will be a part time one, and the Lecturer will require to give Lectures and Laboratory Demonstrations in accordance with the College curriculum.—Further particulars may be obtained from the Secretary, Mr. James Austin, LL.B., 105 St. Vincent Street, Glasgow, with whom applications and five copies of testimonials should be lodged not later than 31st July, 1925.

ALL COMMUNICATIONS RESPECTING ADVERTISEMENTS MUST BE ADDRESSED TO THE ASSISTANT SECRETARY, 10 GRAY'S INN SQUARE, W.C.1.

**** It must be understood that the acceptance by the National Veterinary Medical Association of an advertisement does not imply a recommendation and that no responsibility is accepted with regard to the accuracy of the statements therein contained.*

The Veterinary Record.

(*Founded by William Hunting F.R.C.V.S., 1888.*)

EDITOR: G. H. LIVESEY, M.R.C.V.S

No. 27. JULY 4, 1925. VOL. 5.

Milk: Its Production and Distribution, with Special Reference to Tuberculosis.*

By F. A. DAVIDSON. M.R.C.V.S., B.Sc.,
Royal "Dick" Veterinary College, Edinburgh.

INTRODUCTION: I commenced writing this paper by consulting the dictionary as to the meaning and derivation of "milk," and this is what I found—"The fluid secretion of the mammary gland forming the first food of new born Mammalia." These facts certainly give us to understand that milk, as a food, has been in vogue since our own species first graced this globe. It would be more difficult to state at what period the human race commenced to make use of the domestic animals as a source of supply; however, we can assume that some races, at least, have consumed their milk for centuries, though probably goats were the first so used.

In modern times the cow has come to be regarded as the great milk producer of all countries, though in some the goat is very much in evidence and in certain areas mares' milk is consumed, whilst in China and India the water buffalo is being bred for milk production. Many countries, on the other hand, never use the milk of their domestic animals, even though they are numerous. Such is the case in practically the whole of China, the Soya bean taking the place of milk, though, of course, in the region of foreign settlements the Chinaman is following the customs of his European brethren, so that the milk consumption in those areas has gone up by leaps and bounds and still grows in ever widening circles.

Milk, meaning that secreted by cows, has become to-day one of the main articles of food in this country and naturally children are the greatest consumers, and education, with ever altering social conditions, increases the consumption yearly. However, it is only during the last few years that we have heard any great clamour about what we might call a milk problem; previously its production and consumption were merely daily necessities of no special importance.

What is the result of this indifference? It is this—the bulk of the milk used in this country to-day is more or less a liquid containing poisonous toxins and innumerable bacteria, many pathogenic to man. On the surface, this position seems hardly possible, but it is so, simply because the effects of drinking such milk may only be a temporary malaise or, if fatal, they are slow and insidious, and the appearance of the milk is usually devoid of any suspicious signs. Thus the consumer (general public) does not bother to pay more, or ascertain that what he is getting is good and wholesome, as the other seems all right, and the producer does not see why he should worry, as he thinks it will cause him a lot of expense, etc., for which he might not be amply repaid in cash, and both sides put forward their eternal excuse of the survival of their ancestors under similar conditions.

Undoubtedly most of this is due to lack of education, a sorry state of affairs in the greatest country of the world to-day, especially when we find that other nations have long since tackled the problem and progressed far towards solving it, while we are only preparing to think about it.

ANATOMY: In dealing with any diseased or unsound food, it is essential to have an intimate knowledge of its normal appearance and composition and the method of production. If so equipped, one can judge all cases in an economic but safe manner, and apply the results expertly by going straight to the source of the trouble. As this paper will have to cover a lot of ground I shall merely mention the main facts of the normal and pass on to other matters and confine my remarks to the bovine producer.

The cow's udder, or mammary gland, is, with rare exceptions, composed of four glands which are closely connected anatomically, but they do not intercommunicate. The gland parenchyma consists of series of alveoli and small ducts lined by a single layer of secreting epithelium. These lead into still larger ducts with a double layer of cells and thus into the milk cistern at the base of the teat. Supporting this system of secreting cells is a framework of connective, elastic and fibrous tissues in which the vessels and nerves are situated, giving the gland a lobulated appearance. The teat leads directly out of the galactiferous sinus to the exterior, having one canal and orifice. The canal lining is non-secretive pavement epithelium running in longitudinal folds. The wall contains bundles of involuntary muscle fibres forming an elastic covering with a sphincter at the orifice. The skin of the teat is smooth, hairless and contains no sebaceous glands.

Of the blood, nervous and lymphatic systems, only the latter requires any mention here. The associated lymph glands are the supra-mammary—usually two on each side, lying together at the posterior border of the base of the hind quarters and if one takes a deep hold of the loose skin at this point they can usually be palpated.

PHYSIOLOGY: The physiology of the onset of lactation has never been solved and various theories

*Presented to the North of England Division at Durham, on May 30th, 1925.

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have been put forward. Pregnancy and the act of parturition seem to be the controlling factors, but whether from nervous phenomena or by substances carried in the blood or lymph streams is as yet unknown. In the heifer marked development of the mammary glands begins shortly after the occurrence of pregnancy and progresses so that a few days before parturition they are in an acute state of congestion and physiological inflammation. In the animal which has already had a calf and given milk, this severe hyperæmia commences in the last week or two before calving. Milk is usually secreted soon after the birth of the calf, though it can easily be induced before this. The congestion lasts for about five days, possibly longer in heifers, and gradually subsides until the udder is normal.

In the average cow, impregnated within a few months of calving, the duration of lactation is until a week or two from the birth of her next calf. If the cow does not carry another calf she may go on milking for well over a year; in Hong Kong I had a cow on the farm which had been milking for nearly three years and when I left was still giving close on three gallons per day; this, of course, is exceptional. The yield is at its highest about the first to second months after calving; it will then fall off so far but remain at an almost fixed high level until a month or two before calving, then gradually recede and, just before parturition, rapidly cease.

There are many things which influence the permanent milk yield of a cow, such as breed, breeding, feeding, disease, and how she is milked. As regards temporary fluctuations, the most notable are sudden changes of temperature, change of premises and feeding, disease and œstrum.

Composition: The constitutents of milk are either in solution, suspension or emulsion and the analysis varies considerably both in different cows and the milk of the same cow, and only very average figures of percentage composition can be given.

The constitutents are:—

(*a*) Proteids: These form about 3·6 per cent. of the total constitutents and are casein, milk albumen and globulin held in suspension and lactoproteins in solution.

(*b*) Fat: 3·7 per cent. in emulsion. This is physically and chemically considerably different from both nutritive and body fat and, though the milk fat may be greatly dependant on both of the former, yet a definite transition from either into milk fat cannot be claimed, the mammary gland cells using the materials at hand to build from.

(*c*) Milk Sugar: 4·9 per cent. in solution. This is devoloped in the mammary gland and glucose is used in its formation.

(*d*) Salts: ·7 per cent. soluble and insoluble. They are principally compounds of potassium, calcium, magnesium, phosphoric acid, etc.

The specific gravity, since it depends on a very variable analysis, must also be uncertain and fluctuates between 1·027 and 1·034.

Colostrum, that is the secretion of the first few days after calving, is yellow and slimy in appearance, and the composition and microscopical appearance are entirely different from ordinary milk. In fact, one can best compare it to the secretion due to glandular inflammation, the irritation in this case being physiological. Chemically, the greatest changes are increased albumen, solids and specific gravity; microscopically, there are large numbers of cells, leucocytes and blood corpuscles.

Of course it will be readily understood that any severe or generalised disease will considerably alter the chemical analysis of milk and, though no definite fluctuation from normal can be given, the milk from any cow so affected cannot be considered as pure food independent of bacteriological reasons.

Various factors contribute to the normal changes in the constitutents of milk, such as age, periods between milkings, feeding, pregnancy, period of the lactation, whether the cows are being milked dry or not, etc.

There are other normal constituents of milk which must be mentioned. The first are the ferments or enzymes, substances which hasten chemical changes in milk, and distinction must be made between these—fermentation proper—and the ferment-like processes of bacteria. Each of these ferments splits up certain constituents, is of importance in certain tests and is destroyed by heat at a compararively low temperature. There are also various biological processes which take place in the animal body and result in the formation of certain substances in the blood, and it has been proved that these are usually found in the milk. They are toxins, anti-toxins, agglutinins, precipitins, etc.

Impurities found in Milk: *Internal Influences.*—(*a*) Toxins: There is undoubted proof that, should a cow be suffering from disease which results in toxin formation within the body, and these pass into the blood stream, they will probably be found unaltered in the milk secretion. There is no need to enumerate the specific instances of such toxin absorption, but probably the best examples are certain septicæmic conditions, of which septic metritis is the best and most common example. One has only to consider these diseases and their effect on cows to realise that, should toxins be passed out in the milk stream (and it has been proved that they do) the consumption of such milk may possibly be harmful, especially to infants. In fact, the milk from all cows suffering from any febrile or bacterial disease is an uncertain product, since, even though it does not contain toxins or bacteria, the composition is greatly altered.

(*b*) Bacteria: The milk from a healthy and normal cow, if taken direct from the milk sinus, will be found to be sterile. Therefore one of the most important points in controlling clean milk is to know when the secretion from a cow is possibly germ laden. In many cases one can definitely state that this is so on clinical evidence alone, in others, however, the possible presence of bacteria can only be suspected and the milk examined by microscope, culture, or inoculation to furnish definite proof.

Under what circumstances are we to expect such contamination? Certainly the primary cases are all

diseases of the mammary glands. These might be divided into the following groups :—

(*a*) Streptococcal, (*b*) Traumatic, (*c*) Tuberculosis (*d*) Other causes.

(*a*) Streptococcal : This form of mammitis is undoubtedly the most common of all and there is no need for me to describe the symptoms to the present meeting. In the majority of instances the infection is introduced from the exterior by way of the teat canal, though in others the focus or origin may be from some other part of the system. The germs gain entrance in many ways and can often be found in the teats of healthy cows just before milking, disease only occurring when the vitality of the gland is lowered and the streptococci are present. They may enter through contact of the teat with infected floors, the hands of milkers or from the introduction of dirty straws and teat syphons. Thus is it quite common to find more than one quarter affected and possibly several cows on the same premises. All stages of the disease—acute, subacute and chronic—are dangerous to the milk supply. Certainly in the acute type the milk secretion ceases, but the primary stages just before this occurs and the disease is recognised by the owner, are fraught with danger. Later, septic discharges are liable to contaminate the milk from other quarters or even other cows. In the two other types the same holds good, even more so, since it is possible to find glands affected with subacute and chronic mastitis secreting milk which is teeming with bacteria and the analysis greatly altered from normal.

(*b*) Traumatic : The majority of these cases are streptococcic and they result from external laceration, deep or superficial, of the mammary parenchyma, milk sinus, or teat, with the introduction of bacteria, either at the time of injury or afterwards from contaminated floors, etc.

Various human ailments, often epidemical, have been traced to a cow suffering from streptococcal mastitis. Certainly some alimentary disorders are due to such causes, especially diarrhœa in infants; but most striking are epidemics of sore throats resulting in the discovery of cows with streptococcal mammitis and the isolation of identical organisms.

(*c*) Tuberculosis : As I later refer to tuberculosis and milk in some detail I shall pass it over at present.

(*d*) Other causes : It is quite possible to have the mammary glands affected with other specific infections than those mentioned above and only a few need be noted here. Actinomycosis is generally traumatic in origin and, though there is no direct evidence of transmission from animal to man, the milk must be considered as unsound owing to quantities of pus. Of other bacteria causing mastitis *B. pyogenes*, *B. necrophorus*, the Coli-typhoid group and one or two species of Staphylococcus are the commonest, and practically all of them have been found on occasion to cause alimentary troubles in human beings.

Unfortunately, it is not only in mammary affections that we find milk which is laden with organisms being secreted. In nearly all septic and pyæmic conditions where bacteria find their way into the blood stream, they may be secreted in the milk. Of special importance in this connection are the retention of the placenta, septic metritis and alimentary disturbances. There is evidence that the drinking of milk from animals so affected has caused malaise in both children and adults. Diseases caused by specific organisms, and more or less infectious, furnish many striking examples of the milk being infected before secretion, such as anthrax, tuberculosis, hæmorrhagic septicæmia and foot-and-mouth disease, all of which may cause disease in man from drinking infective milk. The classical example of disease being transmitted by milk is Malta fever and, though the goat is the usual animal at fault, yet cows may be affected. This disease, owing to the close relationship of the causal organisms, has given rise to extensive investigation as to the possibility of milk from cows suffering from infectious abortion causing illness in human beings. Cows which have aborted or have been vaccinated against abortion are found to excrete large numbers of *B. abortus* in their milk, and though no proof has been forthcoming, the danger to consumers should not be lost sight of. I may say that in China I vaccinated large batches of cows for abortion every week and though the bacillus could afterwards be found in the milk, at no time had the medical practitioners found disease, such as Malta fever or human abortion, as a result of the consumption of our milk.

External Influences causing Contamination of Milk : This section of pollution is that which occurs from the moment the milk leaves the teat until it is consumed. This is undoubtedly the most common and greatest but, in my opinion, not the most dangerous, since those germs secreted along with the milk as a result of the disease of the cow, are usually much more pathogenic to man, those introduced after milking being mostly saprophytic and innocuous.

To be Irish, this external pollution really commences before the first of the milk has left the teat, since, after milking, bacteria from the floor, etc., find their way into the teat canal and proliferate. Therefore,under average conditions, the first drawings of milk contain varying numbers of bacteria. As regards milk production and distribution, it must be understood that I am describing what is occurring daily in the average cowshed, dairy, etc., in this country. However, in first class, hygienic establishments the same mistakes are liable spasmodically to occur through carelessness, thoughtlessness or even indifference.

The next factor, I suppose, is the milker, whose hands are constantly handling pails, milking stools, the cow's tail, etc., when milking, and most probably the first thing he did before starting was to clean the byre and remove the manure. Then, of course, there is also the grave possibility of the contamination of his hands from cows suffering from mastitis. Next arises the question as to his own health, or contact with persons suffering from infectious diseases; septic hands and infectious diseases are the greatest dangers here. The possibility of " carriers " being milkers has repeatedly been demonstrated, especially as regards

such diseases as typhoid, paratyphoid, diphtheria, etc. Annually we have fresh records of outbreaks of human infectious diseases due to dissemination by milk contaminated by indirect contact with acute cases, or the so-called "carriers," who have not been suspected of harbouring causal organisms until such an epidemic has been traced. The clothes of the milker are another serious danger, as usually the same ones are worn for all his work.

As general practitioners,you all see daily the amount of filth adhering to a cow's udder, flanks and quarters, and during milking much of this is dropping into the milk pail. More important are the excretions from the rectum, vagina, and, to a less degree, the mouth. Even in the normally healthy animal all of these have a high bacterial content and this finds its way into the milk directly through splashing, pollution of the atmosphere, from being rubbed off the skin or from a swish of the tail. Therefore, if the animal be suffering from disease, this danger is infinitely greater, as in the majority of microbial diseases either the fæces, urine or expectorate contain the causal organisms. Probably a diseased animal contaminates milk more in the pail than by the secretion of actually infected milk. The most important diseases in this respect are alimentary-tuberculosis, pneumonia, and metritis, especially when there is also retention of the fœtal membranes.

It will be readily realised and admitted that the atmosphere of the average cowshed is heavily germ laden, from innumerable reasons. First there is the building itself, its construction, ventilation, drainage materials used for the floor, roof and walls and last, but not least, its immediate surroundings, especially as regards collection and disposal of manure. Cowsheds vary from modern stone, brick and cement—well drained and ventilated buildings—down to mere wood and corrugated iron hovels, in which the drainage is nil, the ventilation and light merely what the bad construction provides, and to enter, even in the best of weather, means wading through a quagmire of mud and manure. One common fault is lofts, which not only cut down air space and interfere with light and ventilation, but they also contribute to air pollution owing to faulty floors. Air space and ventilation are very important, both with regard to the general health of the cows and the purity of the milk. An animal uses up so much air every hour, so that there must be constant changing to keep the atmosphere reasonably pure, but the number of times the air of a building can be completely changed within an hour is limited, if draughts are to be avoided. Therefore, if the air is to be free from excessive ventilation, there are definite standards of air space per cow which must be observed, and also of ventilation, for even in big, airy sheds, if the outlets and inlets be too small, draughts are caused. It must be remembered that fresh air and sunlight are two of the best germicides at our disposal, but the presence or absence of an offensive odour must not be regarded as a criterion of the condition of the atmosphere.

How the byre is kept greatly depends on the construction, state of repair, the drainage, and last—but not least—the occupier and his employees. A shed built of porous and absorbent materials and in which the walls, floor and drains are faulty, is most unsatisfactory in the best of hands and it is impossible to avoid air vitiation. In both good and bad premises it is quite common to find walls splashed and caked with manure and usually, if one investigates further, the surfaces consist of alternate layers of dirt and lime. I should say, from experience of cleaning cowsheds after outbreaks of foot-and-mouth disease, that in many this process had gone on for generations. Limewashing is merely eyewash and a farce, with carbolic disinfectants it is innocuous, its only good point being that it helps to light up a dark shed, but it is the protector of the dirty cowkeeper and covers loads of dirt. Dirty and frequently soiled bedding, uneven, porous floors with pools of liquid manure, are all serious sources of trouble. One usually finds that, for convenience, the manure is temporarily stored just outside the shed door in a very scattered, unpacked fashion, on the uncemented or unbricked ground and that no provision is made for drainage. When such pits are periodically emptied one can only guess at the pollution in the region of the shed. When the interior of a cowshed is tested for bacterial count immense variations are found at different periods of the day. The greatest increase of all is just after feeding, especially of hay and straw; the same, though smaller, occurs after bedding down, grooming, etc. There is a decided decrease in those sheds in which a reasonable quantity of water is used in washing the walls, floors, cows, etc., a prevailing state of dampness considerably lessening the counts.

If milk pollution ceased at this point in its production and distribution one might foresee an early improvement in quality at the breakfast table. It would be tiresome to go into details of all the ways in which milk is daily contaminated from the cowshed to the house, and I shall only make a general survey. Firstly, we have the various utensils with which it comes in contact. You are all aware that milk is an excellent medium for the growth of the majority of bacteria at animal and room temperatures. Science has proved that germs and their spores can all be killed by heat, varying from comparatively low temperatures up to and over boiling point; but, according to their resistance, the medium treated and the temperature, they must be exposed to for a certain length of time. These facts show how seriously the question of utensils enters into the clean handling of milk. Not only must they be thoroughly and quickly cleansed, but they must also be sterilised and kept shut off from contamination until they are used. In the average dairy, depôt or house to-day, almost any convenient vessel is used. Most of them have either imperfectly fitting covers or none at all, allowing direct contact with the exterior. On the milk carts covers are constantly being taken off, mixers and measuring cans being plunged in, then hung up on the side of the cart or wall. The

cleansing of such utensils is very difficult, since they are mostly made of metal with too many joints and corners, which, if not perfect when new, soon become so imperfect that milk lies there when they are emptied and acts as a culture medium. Hot water is used in practically all premises, but often all that it does is to coagulate the milk left in the churn and make the cleansing even more difficult. Seldom does one find the temperature or the duration of application sufficient to kill more than a few of the least resistant organisms; in fact, the raised temperature often only aids the growth of the bacteria. As regards household containers, one has to accompany a retail dairyman down any street to have one's eyes opened and one's appetite upset.

I shall not discuss further the possible sources of contamination, but I want you to understand that I have only touched the fringe of the subject and given neither details or proofs, which can be found in any text book or papers dealing with this subject should you wish them.

Clean Production.

I might now say, "so far, so bad, and what are the remedies?"

First of all, it must be realised that it is not difficult or expensive to produce clean milk; on the other hand, it cannot be produced under "any sort" of conditions. In a large percentage of the cowsheds, etc., in this country it could easily be done with no material increase in cost of labour; in fact, a saving in both would ultimately result. I would not assert, however, as some workers do, I believe, that it is possible on every type of premises, that is, without practically rebuilding them.

First and foremost come the actual buildings. What is required here is just this: four good walls (impervious) at least four feet high, an unbroken cement floor, with a good fall from both walls into a wide surface channel; good drainage; good water supply and ventilation; all corners rounded off with cement; as few fixtures for tieing and feeding as possible and the latter fitted so as to exclude spaces between floors and walls. The shed must be for cows alone and no foodstuffs or utensils should on any account be allowed to be kept within the shed except when in use. All inside drainage should be surface and run into a sealed trap just outside the shed, thence by drainpipes a reasonable distance away. The manure pit should be placed at a point and distance likely to give a minimum of contact with the shed and dairy, and must be properly built and drained, this also preventing fly breeding. If you run over these few points you will perceive that many of our existing premises could be improved to reasonable standards with a little cutting out of superfluous and bad fittings and the judicious application of a load or two of concrete and a few bags of cement.

Should you ever be asked to improve the ventilation of an existing bad shed do not hesitate to provide a large area of inlets and outlets—insufficient is as bad as none at all, because draughts occur followed by colds, retained placenta, etc., and the farmer shuts the place up again. Provide for the two extremes of heat and cold and see that the openings permit of air circulation from top to bottom and do not leave the cow standing in a pocket of stagnant air.

Dairies should be built of impervious materials throughout and fitted with hot and cold water, a milk cooler and some provision for keeping clean utensils under cover. In the case of the small producer one can only expect sterilisation to be carried out by boiling, but where there are more than a few cows, or the quantity of milk handled is large, sterilisation by steam under pressure should be used. A small boiler with a few pipes is all that is required and the price will soon be cleared from the saving of coal, time and labour. These recommendations are directed at the improvement of existing buildings. All new premises must have their plans passed by the responsible authority but, unfortunately. it often occurs that those who draw and pass judgment on such plans know little of the subject. Thus many modern premises are unsatisfactory and provision should be made in future to obviate all such mistakes.

If the question of clean milk production is one bristling with many problems, that of distribution is even more so. Undoubtedly, the solution is the bottling of all milk, either at the farm or conveyed from there in sealed churns to distribution depôts or creameries, where it is possible to bottle and seal by machinery. Pending the attainment of that ideal, all milk bottled should be required to have a guarantee as to its quality and place of bottling, and thus put an end to the abuse of this process which occurs at the present time. Until such time as the number of grade producers are considerably increased, improvement of distribution must necessarily be confined to the rigid supervision of the construction and cleansing of utensils, not only in the towns but throughout the whole country, from the producer to the consumer, and also by education and persuasion, limit the exposure of milk to the atmosphere. Three great faults in this respect are open milking pails, the dipper and can method of supply to the house-wife and the necessity of mixing during the rounds.

From practical experience I have found that once a cow is clean it is easier to keep her so than dirty, and the excuse that they are tied up is no excuse—mere humbug. The hindquarters, legs, feet and tail should be washed down at least once a day and at each milking the udder and teats washed and dried, just before milking. The ends should be cut off the tails, and also the udder run over with clippers every two or three months. The other parts of the cow should be dry groomed daily, but not before milking.

No feeding of dry foodstuffs should be done later than an hour before milking and preferably left over until after all milk is out of the shed. Before each milking the bedding should be thrown up from the hind feet of the cow, manure removed and the tail end of the stall, the channel and passages, swilled down with water. At least once a week *all* bedding should be removed and the whole floor, feeding troughs, walls, etc., scrubbed and disinfected.

To sum up, all labour within the cowshed should be divided into two groups, wet and dry, the former to be done before milking and the latter at least an hour before and, if possible, just after. The milker should do nothing but milking once he starts, first donning clean overalls and headgear and washing his hands.

There are one or two other items which must be mentioned in connection with clean milk. The first is straining, which, in my opinion, is usually a pernicious practice in the average cowshed and only camouflages a dirty milker. The sieve is usually only washed after every so many cows, or not at all,and each successive pailfull passing through its meshes breaks up the sediment already there and liberates germs which would only be held back by a cotton wool filter. The next point is cooling, which is essential for the production of clean milk, especially during hot weather, but, like other things, it may defeat its object. The aim of this process is to reduce the temperature of the milk so that the growth of bacteria is stopped or retarded, and bacteriological statistics have proved its value in no uncertain measure. The mistakes usually found in connection with it are insufficient and delayed cooling, exposure to a heavily contaminated atmosphere, bad cleaning and sterilisation of the cooler.

Certainly the public should demand and be supplied with clean milk, but the producer should remember that he also benefits through better and easier labour and the cutting of loss, such as less sour milk.

Internal contamination is purely a veterinary question, which, except in big towns and a few other localities is entirely neglected. The day will arrive, however, when this danger will be universally combated. Therefore it is the duty of the veterinary profession to be competent to deal with the question thoroughly and expertly. I have made a survey of the relation of disease in cows to the milk supply and now I shall mention a few points dealing with the prevention of such produce reaching the consumer. Those of you who are practitioners, daily meet those cases in cowsheds and when I have finished I want you to ask yourselves how often you have, in those circumstances, thought of, or safeguarded, the milk produced.

In the first place I should like to state that in those premises producing milk certified for the feeding of infants and invalids, a cow suffering from any disease or open septic wound should immediately be removed and her milk not sold as such. Ultimately, I suppose it will be possible to apply the above rule to all sheds, but for the present we must be content with less drastic procedures. Certainly all cows suffering from septic and pyæmic conditions ought to be isolated, and their milk, and that of any animal registering a temperature, excluded from the bulk and only used for cooking, calf or pig feeding, after boiling. The commonest disease met in this connection, and requiring rigid exclusion, is retention of the placenta with septic metritis and the stalls should also be thoroughly cleansed and disinfected; these cases should be milked last and the milkers' hands and the pails treated after use. This also applies to cases of mastitis, and the pernicious practice of drawing the teats of affected cows on to the floor should always be forbidden. The discharges of affected quarters ought to be milked into an old pail or tin with some crude disinfectant and the whole udder washed with antiseptic before milking the healthy quarters, and specially disinfect floors. To many of you, I daresay, such stringent measures will appear faddish, but after two or three years of nothing but dairy work, where a herd of about 1,000, with their milk right until it reached the consumer, was under the complete control of about three of us, I can say that all such procedure is of the greatest importance, both to the consumer and the producer. In Hong Kong every cowboy had samples of his milk taken at every milking and tests and bacteriological observations were made and recorded. After a little study and experience I was able, not only to find contaminated milk, but fairly confidently to diagnose the cause. Thus it was possible to accuse a coolie with bad handling, such as milking in open pails, not washing his cows and shed before milking, etc., without actually having seen him do it. These samples also often helped me to find unsuspected cases of chronic mastitis, metritis, etc., cases which were not diagnosed except with a detailed examination of the suspected group of cows. The evidence of these samples would lead me to say that no cow should be allowed to calve in the same shed as others giving milk for consumption, and only re-introduced when the post-parturient discharges have ceased.

It is very problematical just how all these faults are to be remedied and achieve a milk supply of one grade. For a long time pasteurisation has been claimed by many as the panacea of all milk evils. Certainly it corrects the bad effects of a milk supply, but it adds some more of its own. It is a remedy which, like many others, attacks the problem in the middle and does not produce good milk. It merely renovates the bad and provides cover for the dirty cowkeeper and the diseased cow. The process can only be carried out by creameries and under strict and expert supervision to assure that its object is attained. From the consumers' aspect it leads to a false security, since in the household the commonest test of wholesome milk is its sourness. Pasteurised milk, owing to its better keeping qualities, is often being used in all good faith, when it is probably chemically bad and also heavily contaminated with bacteria introduced after treatment.

The problem must be tackled from beginning to end —that is, to produce clean milk and keep it so until consumed. There are two methods in vogue at present, legal and educational, but both are only half-hearted and very disjointed in their application. Certainly the Acts and Orders in operation at present might be greatly improved, and you will have all read expert criticism on them. However, the manner in which they are carried out, except in a few instances, is even more ineffective. The work is perfunctorily allotted to some one with a host of other duties, who has no special knowledge of, or interest in, the subject

or the conditions connected with it. This apathy and ignorance leads to friction, etc., between the producers and the Local Authority and results in a lot of unnecessary work and trouble with no real progress or improvement in the milk production.

Education in the past has been very haphazard and has assumed various forms, such as model dairy farms (run by the wealthy), etc., propaganda, clean milk contests and, in some districts during the last few years, clean milk demonstrations and lectures.

Model cowsheds and dairies with their beautiful array of fittings, are very nice for show places for taking deputations, committees, tourists and such like to see and create an impression. Is it much good showing them to a farmer occupying bad premises, whose profit does not do much more than keep the business going and his family alive, while his landlord will do nothing for him in the way of improvements? When he sees such places he studies their upkeep economically and decides he cannot afford to produce clean milk by those measures.

Turning to propaganda, we find that there has been very little boosting of clean milk or the publication of instructive articles to producers and consumers. It has consisted principally of statistical *data*, wholesale condemnations of everything connected with milk and schemes for wonderful reform, and has usually appeared as articles in professional periodicals or the daily press. Naturally all of this has been mainly directed at the producer and as all classes of persons have written, whether knowing anything of the subject or not, there have been many inaccurate statements and exaggerations, resulting in a " back-up " attitude of the producer and much confusion and trepidation amongst the general public. Ten minutes talk and walk round with the dairyman on his premises will do more good than hours of writing.

Certainly a big step in the right direction is the organising of clean milk contests, but their effectiveness is very limited, since usually only comparatively few participate and only the better class dairies enter, without much change of entries year after year. There is one other fault I have noticed—the meagre attention given to the health of the cows in many of the competitions; no provision is made for the examination of udders, and tuberculosis is disregarded. One good point is that, since there is usually much publicity given to them and the names of the competitors occasionally appear, it gives them a little prominence and may help their sales.

At the present moment the best system of education is demonstrations and lectures on all types of farms. Thus it is possible for experts to get amongst the producers and show that clean milk is easy and inexpensive to produce and will ultimately lead to greater profits and better working conditions. They must be made to realise that they will materially benefit, as there will be increased consumption, with bigger demand and increased prices in proportion to cost of production. Once, in Hong Kong, we were able with a little reorganisation of handling in certain sections of the farm, to save hundreds of dollars from less souring of milk, the extra expense being nil.

To make this educational system effective, it must be combined with legal enforcements. I do not think the Law was ever intended to punish those who err through sheer ignorance, therefore teach and then punish. The Laws and Orders are there already, they can be improved, but provision is made for the drawing up of new Orders as required and Local Authorities can make their own bye-laws. What must be enforced is that all responsible Councils strictly carry out the existing Regulations and so guarantee uniformity of action and not the haphazard and indifferent administration of the majority at present.

Along with this lego-educational organisation much useful propaganda might be carried out. First, under the present system of grading, I think it is the duty of the Local Authorities periodically to publish the names of such producers, their grade of milk and where it can be obtained. Failing that, the producers themselves ought to combine and furnish this information. It is also the duty of the medical practitioners to do more — they must recommend such milk for infants and invalids. If I were producing grade milk I should circularise them by letter. The general public must also be educated, either by popular lectures, pamphlets or advertisements. All this would lead, I think, to the desired increase in consumption of this type of milk, it would then command a better price. This extra remuneration to the producer would probably induce a quicker and more voluntary reformation than either legal or educational measures.

Milk and Tuberculosis.

I have left this specific form of contamination for separate and special consideration, since its economic and Public Health aspects in relation to milk stand out above everything else.

Briefly, the bacteriology of tuberculosis is as follows:—the causal organism is a slender, granular non-sporing rod which only stains by special methods, the commonest being the acid fast process of Ziehl Neelsen. Its staining peculiarities are due to a waxy covering, which gives it special powers of resistance and is of importance in disinfection and sterilisation. Cultures grow very slowly and only on special media. There are three distinct strains, which are:—

(*a*) Human: found, and most virulent, in man—this may be found in cats and dogs.

(*b*) Bovine: in cattle, goats, pigs, horses and man.

(*c*) Avian: up to the present isolated from poultry and pigs.

Of the laboratory animals, rabbits and guinea pigs are the most susceptible and the commonest used in experimental work and for diagnosis.

The distribution of the lesions within the body of the cow is wide and varied. There are all types, from skin affection to a septicæmia and usually the lymphatic system is intimately connected with the course and distribution of the disease. The location of the lesions in the majority of cases depends on the mode of infection, whether alimentary or respiratory, but

in advanced cases it is practically impossible to tell where the disease first commenced. In relation to milk, affection of the mammary parenchyma and associated lymph glands is of most importance. The course in these organs is chronic and most commonly found in the lymph glands alone or in both parenchyma and glands, but it is not unusual in the former *per se*. Owing to its insidious nature, its presence may pass undetected by the owner for months and then only be found after careful and expert palpation. One often sees definite points for differential diagnosis, but my own experience is that in the majority of cases it is not the easy matter some people think to give a definite opinion on clinical evidence alone.

The distribution amongst bovines in this country is extensive; slaughterhouse statistics and the results of tuberculin testing confirm this and show that the majority of cows are affected to a greater or lesser degree. *Ante-mortem* the disease can be detected, with a very small degree of error, by means of the tuberculin test. Only a very small percentage of those who react actually secrete tuberculous milk; on the other hand, the disease does not require to be clinically present in the udder to find the bacillus in the milk. Many research workers have stated that in those cases where cows secrete ineffective milk and show no microscopic evidence of mastitis, it is always possible to find microscopic lesions. Therefore, though the majority of cows giving such milk are suffering from clinically evident tuberculous mastitis, all reactors are potential sources of danger. External contamination is a grave matter, since many cows excrete large numbers of bacilli in the fæces, urine and by expectoration, thus polluting the atmosphere and endangering the whole of the milk produced in the shed. It must be remembered that it is possible for the numbers of bacilli passed out in the milk to vary between wide limits, so that in a sample taken one day the presence could easily be detected microscopically and yet a week later find the reverse. The percentage of milk found contaminated varies in different districts and depends greatly on local conditions, but it is considerable in the average supply. Contrary to the general opinion, butter and cheese is often badly affected and in those commodities the germ may retain its virulence for months. For years there has been controversy as to whether such milk is pathogenic to human beings, and, if so, to what extent. I think that any sane minded person will now admit the first point, in view of the findings of reliable research workers. In fact, one can go further and state that in very young children and certain definite forms of the disease, the responsible organism in the majority of cases is bovine in origin. Considering these facts, it is surprising that the presence of tuberculosis amongst cattle and swine is not even greater than it is.

Up to the present day no serious effort has been made to rectify this unsatisfactory position. There are two definite schemes put forward as possible solutions. The first has been preached for many years, namely, testing with tuberculin and the elimination of all reactors by slaughter, or combined slaughter and isolation. The other, comparatively recent in origin, is vaccination, and, since it is in the experimental stage, with only sufficient published results to justify more extensive tests, any criticism would be premature. Certainly it must be remembered that a policy of slaughter, though eradicating the disease, will produce herds which will become more and more susceptible to infection, as has been proved in many other infectious diseases.

In theory, the widespread testing and elimination of all reactors is perfect and ideal. What would the the result be, however? Complete dislocation of the milk trade—and it must be remembered that many more children have suffered through lack of milk than from drinking it. All reactors do not give tuberculous milk, therefore the law must, for the present, only deal with those secreting infective milk, or which are liable to contaminate it by excretions. It is essential that this policy be vigorously carried out throughout the whole country, and to make it effective all dairy herds must be examined by competent veterinary surgeons three or four times every year. Along with this elimination of "open cases" of tuberculosis, a campaign of disinfection of premises, etc., must be carried out. I am certain that it is very seldom a farmer is advised to scrape, wash and disinfect a shed, or even the stall, from which a tuberculous animal has been removed. It must be realised that tuberculosis has to be handled, like all other contagious and infectious diseases, by disinfection measures. This, in my opinion, is one of the best arguments against wholesale testing of cows at present. What is the use of having animals tested if they are liable to be exposed to infection in cowsheds, trucks, markets, etc.? Trade in tested cows can only be effected at present between owners of safe premises and herds and by private bargain. I would say, however, that all milch cows exposed for sale should be milked out and their udders examined. For the present, testing must be left to private enterprise under expert guidance, until over 50 per cent. of our herds are clean. Create the demand and ensure a reasonable price for certified milk and the growth of tuberculous free herds will slowly, but surely, follow.

I would also like to state here that the time has arrived when Local Authorities must consider the provision of laboratories under the direction of the responsible departments and solely for the use of milk, meat and food inspection—especially the former.

It is superfluous for me to point out that the veterinary surgeon is the central figure in the question of a clean milk supply. He is the only person qualified to supervise the whole process of production, etc., and the health of the cow is in his hands alone.

Discussion.

Dr. Henry Smith, in opening the discussion, expressed the pleasure he had derived from listening to such an excellent discourse on the important subject of milk. He thanked Mr. Davidson for his paper, and the Division for inviting him to be present at the meeting.

He had not previously thought that so much contamination of milk took place before passing into the can. He was sure much more might, and should, be done in the inspection of herds, cowsheds, etc., and in this connection thought the veterinary surgeon could do much more to stop tuberculosis than the medical officer. Much of the money spent on sanatoria and curative treatment would be better employed in providing more frequent and stringent veterinary inspection of herds and cowsheds.

Mr. JACKSON YOUNG congratulated Mr. Davidson on his able paper. Referring to the chemical composition of milk as altered by disease, he said the milk of cows affected with contagious abortion shewed no change chemically; contagious abortion of cows had no effect on human beings. The milk of cows suffering from septic metritis was, however, extremely dangerous; it was not even fit for pigs.

We had notices advising the public to "Eat more fruit," "Eat more meat," etc.—he would like to see a notice "Don't drink T.B. milk." Buildings for cows were often seriously at fault; rarely was there any provision for isolation. There should be an impervious dado in all byres. Cows having retained fœtal membranes should be removed from the herd. The fore milk, containing many streptococci, and being deficient in chemical composition, should be milked into a special bucket and disposed of, not as many people suggested, milked on to the floor. The bacillus tuberculosis, in many cases, was only intermittently found in milk. This was one good reason for more frequent veterinary inspection of milk herds, which should take place at least once every three months. Referring to the disinfection of sheds, Mr. Young said the Tuberculosis Order, when introduced, should specify the disinfection of the whole shed, and not only the stall occupied by an infected animal. Buildings should be sprayed with some active, inodourless solution, *e.g.*, copper sulphate. Taints in milk might sometimes be traced to damaged tinning of vessels, causing a burnt milk flavour. Clean milk competitions were doing good, but he regretted that, so far, no veterinary surgeon had been connected with these competitions, either on the organising committees or to demonstrate the methods. The place of bottling milk was of importance. In one city at least bottling could only be carried out on premises approved by the Local Authority.

Mr. ALLAN agreed with Mr. Davidson that the whole-time meat inspector frequently had cause for amazement at the state of old tuberculous cows which came up for inspection. These animals had been milked to the last possible moment, and the degree of infection of their milk must have been massive. There was only patchy jurisdiction in this country, which could never produce the best results.

Mr. STARKEY considered that Pasteurisation should be discouraged on every possible occasion. He quoted an old Danish saying that "The man who Pasteurised good milk was a fool, and the man who Pasteurised bad milk was a rogue." People were inclined to think it a successful method of dealing with contaminated milk, whereas, in fact, it was one fraught with great danger.

Mr. PEELE felt that, like other speakers, his knowledge had been refreshed and increased. The milk question was a vast subject, and real good would not result without uniformity of action. Referring to the inspection of herds and byres, Mr. Peele said the one person competent to conduct this work was the veterinary surgeon. He felt sure that medical officers would gladly be relieved of the task. He thought that the most serious contamination of milk occurred after it left the cow, a view which had been somewhat modified by Mr. Davidson's paper. He was inclined to the belief that the most harmful contamination of milk was caused by those who handled it. He quoted the case of an orphanage where the children were suffering from infected throats. This trouble was traced to one source of milk supply, but the examination of the cows revealed nothing of value in the elucidation of the problem. Further observation and enquiry shewed that there was an open cesspool at the byre door, the milk was carried in open pails over a manure heap to a hind's cottage, from where it was supplied to the orphanage. Consultation with the medical officer resulted in the removal of the cows to other premises, and the stoppage of the disease amongst the children. The owner of the premises was compelled to improve his buildings and drainage system. Similarly, much money would have to be expended on these matters to obtain an improved milk supply. The conditions regarding the grading of milk were very weak. There was nothing laid down to prevent the substitution of cows. Pasteurisation was of less value than was generally believed. It was vital to educate the public to buy clean milk and to drink more of the product.

Mr. HOWIE mentioned milk competitions, saying that he had pointed out the desirability of having a veterinary surgeon connected with the competition organised by Armstrong College. Unfortunately his suggestion had not been too favourably received, on the ground that farmers would not be likely to take part with this condition attached. In the course of his duties he hoped to visit at least some of the farms and would endeavour to impress on the farmers the measures necessary for producing clean milk. He had found the cleansing of utensils to be of great importance in producing and delivering clean milk. Milking pails should be covered, or at least partially so, and milk should be removed from the byre in covered vessels. Sterilisation of utensils by steam could be carried out by using the ordinary copper. A tube should be fitted in the lid, through which a satisfactory head of steam would issue. By inverting utensils over this tube steam sterilisation could be effectually conducted. It was essential to have a proper place for the storage of the sterilised vessels. Washing of the udder, by which was meant wiping with a damp cloth, discarding the first milk, and dampness of the atmosphere in the byre, all helped to produce clean milk. Mr. Howie recalled one case where the bacterial count was infinity. The buildings were good, well kept, and the cows clean. The farmer did not discard the first

milk, and the sterilisation of utensils and stools was ineffective. Attention to these points soon produced a great reduction in the bacterial count. It was more necessary to attend to the cleanliness of cows, milkers, utensils, stools and buildings, than to have model dairies. Clean milk could be produced in poor sheds. No really suitable apparatus had been devised for Pasteurisation. It was difficult to keep a quart of milk uniformly at 145 degrees for 30 minutes, and to prevent leakage. Pasteurisation not only killed the harmful bacteria, but also the lactic acid bacillus, and so removed the danger signal of sour milk. The diagnosis for tuberculosis of the udder was not easy, except in obvious cases. Cows might give tuberculous milk although clinical examination gave a negative result. This was specially true in those cases of tuberculosis with emaciation, but even in those cases it was not always possible to demonstrate the organism by the microscope, owing to its intermittent elimination. The object of a clean milk campaign was not to destroy the herds, but rather to educate the farmer to prevent the introduction of disease. Let them help to save the nation's best asset—the children—by educating the producer to supply clean milk, and the public to use more of the better product so made available.

Mr. HILL had little criticism to offer, but asked for information on one point. Mr. Davidson had said that where there was mammitis in one quarter the milk from that quarter should be stripped into a separate vessel and destroyed. Did he consider it wise to allow the milk from other quarters to be used for human consumption? It was very difficult to impress on a farmer the danger liable to arise from the consumption of milk from a cow with retained fœtal membranes. Prosecutions against the producer were undertaken on the ground that the milk was deficient in fat, but the quality was never questioned. Milk might, in fact, be an emulsion of organisms, yet if the fat content agreed with the regulations no action was taken. In one case within his recollection a milk retailer was actually caught filling a can from a roadside trough, and that man was still selling milk. Some people, through dirty habits, were unfitted to sell milk, and if the veterinary surgeon had more power in the matter such objectionable practices would receive greater attention. The only proper person to supervise the milk supply was the veterinary surgeon. Money would be saved if the control of milk, including retailing, was absolutely in the hands of the municipal authorities. The money thus saved could be better spent in improving herds and buildings.

Mr. WILKINSON thought that much of the milk in the country was produced under appalling conditions, both in reference to buildings and attendants. The time was long overdue for improvements to be made.

Mr. BLACKBURN was glad that the filthy habit of milking on the floor had been condemned. He objected to the practice 30 years ago. He was somewhat hazy as to the various grades of milk, and he thought the public was even more in doubt as to the position. In support of this he quoted a notice board over a large dairy in a noted health resort, which read, "Licensed by the Ministry of Health to sell Grade A Milk, certified free from tuberculin." Clear and precise definitions should be laid down.

Mr. H. S. ELPHICK said there were no loopholes in the paper. He was in entire agreement with Mr. Davidson, and was specially glad that emphasis had been laid on the frequent inspection of cows and premises by veterinary surgeons.

Mr. MITCHELL thought the Milk and Dairies (Amendment) Act might possibly have encouraged Local Authorities to leave the examination of herds to the initiative of the private owner. Such a course was to be deprecated; cows should be examined periodically, and the more frequently the better, specially in urban areas, where the cow population was constantly migrating.

Mr. C. ELPHICK said the paper was full of practical politics. He regarded milk in the same light as comedians regarded eggs. As there were eggs and *eggs*, so also was there milk and *milk*. The position was due to lack of uniformity in action. As a result the links in the chain against tuberculosis were weak in many places, specially so in the examination of dairy cows and milk after production. Efforts were being made in Northumberland to secure uniformity of action, and until this was universally secured there could be little progress. The education of the public might safely be left in the hands of such bodies as Armstrong College. He was in agreement with the Ministry of Agriculture as to the need of a different type of disinfectant, and would welcome the amendment of the Tuberculosis Order to eliminate the use of the carbolic series of disinfectants, which were not efficient in many cases, and, coupled with limewash, were useless for the purpose. Disinfectants must be reliable. He regretted that members of the medical profession had been unable to accept the invitations sent to them, for he felt that much good would ensue by co-operation on a subject so intimately connected with the public health.

Mr. DAVIDSON, in reply, asked if Mr. Jackson Young wished to respond to the questions regarding the Grading of Milk and disinfection.

Mr. YOUNG said the definitions of the Grades of milk were laid down in the Milk (Special Designations) Order, but he was unable to quote them from memory. He agreed that the Ministry of Agriculture should reconsider the provisions for disinfection, and mentioned that the virus of swine fever had thrived in carbolic acid.

Mr. DAVIDSON, referring to the intermittent secretion of tuberculosis bacilli, said that although the organism could not be demonstrated by the microscope, it might be possible to prove the presence of the disease by guinea pig inoculation. With reference to the contamination of milk, it was noteworthy that a milk company in the tropics had supplied milk for years without the occurrence of disease traceable to the milk supply. External contamination was the greatest, but the most dangerous source was the cow herself. Much might be done without dislocation of

the trade, and without expensive alterations to buildings. The production of clean milk was a sound economic proposition. Cows with diseased udders must be removed from the herd, and in cases of mastitis the milk from unaffected quarters should not be mixed with the bulk. It should be boiled, and might then be fed to pigs and calves. Men with two or three farms should begin the process of improvement, and could do so at little extra expense. The milk should be controlled by bacteriological methods. Local Authorities had powers to make bye-laws regulating the licensing of premises and retailers, and faults under this heading were due to laxity on the part of the authorities concerned. The difficulties, without uniformity of control, were enormous. Control should be undivided from the cow to the consumer, and the man pre-eminently fitted to undertake this work was the veterinary surgeon. He agreed that as a disinfectant carbolic preparations combined with limewash were innocuous.

Therapeutic Notes.

ZINC PEROXIDE: For eczema and other skin diseases this substance is prescribed with half its weight of potassium iodide and one-tenth its weight of tartaric acid. The mixture liberates iodine on contact with moist surfaces.

THEOBROMINE AND SODIUM SALICYLATE: This double salt is useful as a diuretic in cardiac dropsy and chronic kidney disease: administered with digitalis its action is prolonged.

TERPIN HYDRATE: Terpin hydrate in small doses is useful in lessening the cough in chronic bronchitis. It has been used as a remote hæmostatic.

SODIUM THIOSULPHATE: Sodium thiosulphate is rarely administered internally. It is used as a lotion (1 in 8) for ringworm and other parasitic diseases.

SODIUM PHOSPHATE: This is a saline cathartic, resembling in its mode of action the sulphates of magnesium and sodium. A small proportion is absorbed, and thus it forms a source of phosphorous.

SODIUM GLYCEROPHOSPHATE: The glycerophosphates of sodium, calcium, potassium, iron and magnesium, mixed or combined with casein, form the basis of many valuable nerve foods.

SALOL: It must not be forgotton that, when salol is decomposed in the intestine, the phenol liberated may lead to symptoms of poisoning. This action must not be overlooked in the administration of this drug to dogs.

SAL ALEMBROTH: Alembroth salt is a double chloride of mercury and ammonium. It is a powerful antiseptic. It combines less readily with albumin than mercuric chloride and is therefore less irritating to the tissues and more penetrating.

RHUBARB: In diarrhœa due to irritating substances rhubarb is very useful, as its after-astringent effect checks the diarrhœa. In small doses rhubarb is a stomachic especially valuable in atomic dyspepsia.

(*Continued at foot of next column.*)

The Veterinary Record.

4th July, 1925.

AVE ATQUE VALE!

To-day sees the first issue of the *Veterinary Record* under the auspices of the National Veterinary Medical Association of Great Britain and Ireland—to give the Association the title under which it is now registered—and we cannot let the occasion pass without some comment. The new Association started upon its fresh career on July 1st under most favourable circumstances—far better than those which heralded the birth of its predecessor. Let us hope that nothing will occur to mar the bright outlook which is before it.

For five years the Association has been fighting its way in the world and has been endeavouring to obtain recognition outside our own ranks as a representative professional organisation. Though that recognition has now been gained in many circles where the activities of the Association are known, it has only been gained with difficulty by patience and perseverance, owing to the fact that the old Association was branded with the word LIMITED, which, to most minds, implies a company formed for the purpose of trading for profit. Such an object was furthest from the thoughts and wishes of its promoters, and it was most regrettable and unfortunate that this word "limited" should have been forced upon us, sending us out into the world under false colours and conveying to all and sundry a totally wrong impression both of ourselves and our aims. It will cause profound satisfaction to all our members and to our many friends that the word "limited" is now deleted from our title, and that our troubles in this respect are over and done with. The process of closing the affairs of the old company, the preparation and revision of new Articles of Association, the winding up in voluntary

(*Continued from previou column.*)

RESORCIN is a useful antipruritic. Combined with zinc oxide in an ointment it is used in psoriasis, eczema and other irritable skin affections.

QUININE TANNATE: Tannate of quinine is much less bitter than the more common salts and consequently will be taken when the less pleasant salts are refused.

PYRIDINE: Pyridine occurs in the products resulting from the dry distillation of autogenous substances. It is found in animal oil (Dippel's oil) and thus this oil is not suitable for the manufacture of skin dressings. —B. G.

liquidation of the old, and the registration of the new Association has occupied about eighteen months, during which period there have been many anxious moments, voluminous correspondence, and many most trying delays. The formalities to be gone through were innumerable, for, curious as it may seem to those who have no experience of these things, though it might be quite possible for a "crook" to register a bogus company and go through all the formalities in about three weeks, nevertheless, it very frequently takes a genuine company honestly promoted, with no aim at personal gain or profit, more than a year to become registered.

Nothing, however, is worth doing that does not require some effort, and since our efforts have now been crowned with success, we can the more readily and sincerely congratulate ourselves and our new Association on being at last able to take our proper place amongst professional organisations and show ourselves under our true colours—a body of men voluntarily bonded together in an Association whose avowed aim is the advancement of our profession and the promotion of science.

But while we cry *Ave* to the new Association, which we hope so much will bring new life and vigour amongst us, we also call *Vale* to the old "National," which has played such an important part in our professional life in the past. We cannot say farewell without some sad and also proud memories. Our minds dwell upon the names of Fleming, Walley, Roalfe Cox, and George Banham (who, by the way, still practices at Cambridge) who founded the original society in 1883 from among the members of the British National Veterinary College—an earlier organisation; to William Hunting, whose name will always be associated with the "National" and the *Veterinary Record* which he founded. Again, in later years, we remember Frank Garnett, who perhaps was the least ambitious of men and the most earnest worker for the benefit of his profession. Later still our thoughts turn to the early days of the recent company and to those who, through many trials and tribulations, with little money but much enthusiasm, brought the "National" into being as a great central organisation, linking up all the existing veterinary societies into one professional association, and stood as its sponsors in its early years, and nursed it through its infantile troubles. To all these men we owe a great debt of gratitude for their pioneer work. They have sowed that others may reap, and we feel certain than when the fruits of their work come to be enjoyed in future years the veterinary profession will still cherish the names of those who made such a harvest possible.

The Tuberculosis Order.

The following is a copy of the memorandum on Financial Resolution presented to the House of Commons by command of His Majesty (Command Paper 2436):—

MINISTRY OF AGRICULTURE AND FISHERIES.
DISEASES OF ANIMALS.
MEMORANDUM ON FINANCIAL RESOLUTION.

Under the Diseases of Animals Act, 1894, the Minister of Agriculture may, in the case of the existence or suspected existence of tuberculosis in cattle, direct or authorise the slaughter of cattle by Local Authorities, and the payment of compensation for the animals slaughtered out of the rates. Unless financial assistance is provided from the Exchequer, Local Authorities would object to this obligation being placed on them, and the Resolution accordingly provides, in the case of any order of the Minister directing or authorising the slaughter of cattle affected with, or suspected of being affected with, tuberculosis, for the payment to Local Authorities by quarterly Exchequer grants of 75 per cent. of the compensation paid by them.

The Minister proposes, as a necessary complement to the Milk and Dairies (Consolidation) Act, 1915, and the corresponding Scottish Act, to make an order to come into operation on the 1st September next, directing the slaughter of cattle affected with tuberculosis on the lines of the Tuberculosis Order of 1914.

The consequent annual cost to the Exchequer in respect of Great Britain is estimated at approximately £50,000 per annum, while the expenditure of Local Authorities will be about £17,500, plus the costs of administration, but minus the receipts from the carcases of animals slaughtered.

As regards Northern Ireland the contributions will in the first instance be paid out of the Exchequer, but will be recovered by reduction from the Northern Ireland share of reserved taxes.

Diploma in Veterinary State Medicine.

SUCCESSFUL CANDIDATES AT EDINBURGH.

At the examinations recently held at the Royal (Dick) Veterinary College, Edinburgh, the following candidates were successful in obtaining the Diploma in Veterinary State Medicine granted by the Royal College of Veterinary Surgeons:—

Sydney Gilchrist Abbott, M.R.C.V.S., Clydebank.
William W. H. Baird, M.R.C.V.S., Edinburgh.
Ernest R. Corrigall, M.R.C.V.S., Crieff.
James Hill, M.R.C.V.S., Ballyarnott, Antrim.
Donald Johnston, M.R.C.V.S., Hornsey, London.
Thomas McWilliam, M.R.C.V.S., Hamilton.
Harry Preston, M.R.C.V.S., Edinburgh.
Duncan S. Rabagliati, F.R.C.V.S., B.Sc. (Agric.), Ben Rhydding, Yorks.
Arthur R. Smythe, M.R.C.V.S., Falmouth, Cornwall.
George Tullis, M.R.C.V.S., Kirkcaldy.
William Tweed, M.R.C.V.S., Ballymoney, Antrim.
Hugh M. Duff, M.R.C.V.S., Milnathort, Kinross-shire.
Samuel Hunter, M.R.C.V.S., Belfast.
James Plenderleith, M.R.C.V.S., Tankerton, Lanarkshire.

Royal College of Veterinary Surgeons.

Three Veterinary Pioneers.

(*Contributed*).

Members will have noticed a reference in the Annual Report of the College to the Memorial Tablet which a generous anonymous donor has given to be placed on the walls of the Council Room, bearing the names of William Moorcroft, William Youatt and William Percivall. It may be interesting to recall for the benefit of the younger generation something of the work of these three pioneers:

William Moorcroft (1767-1824), was a graduate of the Veterinary School of Lyons. He introduced the operation of neurectomy and wrote with sound common sense on the foot and shoeing, when these subjects were being taught and practised in a very unscientific manner at the College. He conducted a large private practice in London but devoted part of his time to the scientific breeding of horses. Ultimately he was invited to go to India as Superintendent of the stud to direct the breeding operations of the Bengal Government, which was then hopelessly bad. He successfully re-organised the work, improving beyond measure the quality of the output and reducing diseases, especially those of a contagious nature. Ever striving for improvement in the breeding of army horses, he searched for blood stock north of the Himalayas, and in the Punjab, Cashmere, Afghanistan and Central Asia. During the journeys he made important geographical discoveries, exploring countries where no European had ever previously been seen, and recording for the benefit of India the character of the climate and soil, the agricultural features, and the possibilities of all the places he visited. He was a great Englishman, embued with the deepest Imperialism and wherever he travelled his object was to create a respect for the paramount power in India, and to bring to the knowledge of the people the advantages of a humane and just Government. During his years of travel his life was daily in danger; but through his surgical and medical skill in treating the natives he succeeded in the most difficult places. His contempt of danger led him to take risks which were ultimately his undoing. He was foully murdered in Central Asia and the entire stud of stallions and mares he had collected after four years work was lost.

William Youatt. (1776-1847). Entering into practice in London with Blaine he acquired an intimate knowledge of the diseases of town animals, especially dogs, but owing to a quarrel with Coleman he did not take his diploma as a qualified practitioner for many years, not indeed until the creation of the R.C.V.S. He joined Percivall in the *Veterinarian* and very soon took over the sole responsibility for its conduct and carried it on single-handed for years. He had a huge private practice and utilised it in the training of pupils by establishing a school of his own; he also lectured on veterinary subjects in the University of London (now University College) and was in professional care of the animals of the Zoological Society. The last years of his life were spent working with others for the granting of the Charter which created the R.C.V.S. He was one of the earliest to be examined by that body. In the long fight for the Charter the question of insisting that the schools should deal with the pathology of the ox, sheep and pig was ever prominent, and in this matter he had the support of the Royal Agricultural Society. The London School at that time devoted itself entirely to the subject of the horse, the diseases affecting other animals of the farm being neither studied nor taught. In the end he won, but he did not live long after the struggle. Youatt's works on the horse, ox, sheep, pig and dog were widely read, and his lectures on the pathology of cattle and sheep were published in the *Veterinarian*. He was the greatest living authority on rabies and totally rejected the theory of its spontaneous origin. His style was forcible and elegant, his enthusiasm unbounded and infectious and in his burning zeal for the profession in all its branches he was utterly unable to understand the apathy in matters affecting its welfare and progress which then, and since, has characterised the mass of the profession.

William Percivall (1793-1854), was distinguished by his knowledge of the diseases and injuries of horses and his writings may with advantage be consulted today. His exact and charmingly recorded accounts of diseases are models of sound clinical work. He laid the basis of what he termed Hippopathology and his gracefully written volume is a classic. He also gave the profession a work on the anatomy of the horse which for many years stood unrivalled and alone. He founded the *Veterinarian*, which had for its aim the securing of the rights of the profession to govern itself and to examine its own students and the removal of administrative and executive matters out of the hands of the Professors of the London School and the medical profession. Percivall also wrote on the form and action of horses. He was a painstaking, industrious student who recorded for the benefit of others all he had learned by a sound early training and many years of observation and experimental enquiry.

Royal College of Veterinary Surgeons.

Obituary.

Fenny, Samuel, M.R.C.V.S., 35 Richard Street, Mardy, Rhondda. Graduated N. Ed. December 19th, 1894. Died 20th June, 1925.

Pickworth, Herbert William, M.R.C.V.S., 71 Wood Green, Wednesbury. Graduated London, March 27th, 1882. Died 13th June, 1925.

CLINICAL AND CASE REPORTS.

Acute Hæmorrhagic Pancreatitis of Tuberculous Origin in a Mare.*

By Tom Hare, M.B., Ch.B., B.V.Sc., M.R.C.V.S.,
The University of Liverpool.

Subject.—A bay Shire mare, nine and a half years of age, which for the past five years had been at city cartage work in the service of the same owner. Throughout these five years the mare had not been "off work" for any sickness until the onset of present condition.

Clinical History.—On the first day of veterinary assistance being called (18th February) complaint was made that the mare was "off her feed," and it was pointed out that she had been steadily losing condition since the previous summer. The patient appeared constipated, was taken off work, given one dose of aloes and suitable choice food. Though free movement of the bowels for a day or so was obtained, the mare showed a reluctance to take any of the prepared food, and contented herself with water and occasional nibbles of hay.

On the 12th day the mare was ordered two days light team exercise, but became so rapidly fatigued that she was returned to the loose box. Bitter tonics and pot. iodide were prescribed. The constipation remained, but the stools were kept reasonably moist with mag. sulph. in the drinking water. The temperature chart showed but very slight rise and fall within normal limits.

On the 31st day the patient was found lying flat on her side acutely ill. She was observed to turn over first on to one side, then on to the other. She was irresponsive to all attendance.

On the 32nd day the mare lay still, made no attempt to turn, and appeared very much weaker. Later in the day she was turned over by attendants.

On the 33rd day the mare lay prostrate on her left side for eight hours before attempts were made to turn her. In doing so she endeavoured to rise on to her knees, floundered, and crashed heavily into the wall of the loose box.

During these last three days the temperature chart had been showing an intermittent rise and fall between 101° F. and 103° F. The visible mucous membranes were pale, but never revealed any sign of jaundice.

The patient died at 6-45 p.m. on the 33rd day of attendance. No diagnosis had been made.

For the above clinical notes and for the opportunity of making the *post-mortem* examination the author is indebted to Mr. A. W. Noel Pillers, F.R.C.V.S., D.V.S.M.

Post-Mortem Findings. (*a*) *Macroscopic.*—The *post-mortem* examination was made 18 hours after death. Externally there were no abnormal features. The abdominal cavity contained about one gallon of chocolate-brown coloured, odourless, watery fluid; the colour was evidently due to altered blood.

There was gross deformity of the organs in the anterior part of the cavity due to the dense adhesions between the liver, lesser curvature of stomach, duodenum, base of cæcum, diaphragmatic flexure of colon, and right adrenal body. In the midst of these adhesions, and enveloped by thickened, stringy, lustreless omentum and mesentery, deeply stained with altered blood, was a large solid mass eventually identified as the pancreas, converted (with the exception of a small piece of the splenic angle or "tail") into a firm irregularly lobulated tumour about the size of a pineapple. The omentum on the left lateral aspect of this mass showed the opaque white specks of fat necrosis. A median section through the tumour revealed a thin network of dull opaque fibres enclosing irregular masses of soft red to pink coloured tissue nearer the periphery, and areas of white, shining, soft, sticky material at the centre. The lumina of many of the vessels in the tumour substance were occupied by laminated thrombi. The pancreatic mass encircled and adhered firmly to the portal vein, the lumen of which, though patent, was considerably flattened by the tumour. The endothelial lining of the vein appeared healthy. Posterior to this constriction thrombosis had occurred in some of the portal tributaries. Laminated thrombi occupied the splenic vein, the pancreatico-duodenal vein, the tortuous mesenteric radicles draining the first few feet of the jejunum, and the pancreatic veins. No laminated thrombi were observed in the remaining mesenteric and colic tributaries, their lumina being filled with dark coagulated blood. These thrombi lay loose on the lumina of the veins. Radiating from the central mass of the pancreas chains of enlarged lymphatic glands could be traced the glands passing to the portal fissure of the liver, the glands along the lesser and greater curvatures of the stomach, thence on to a group of glands on the abdominal surface of the diaphragm, also the glands studded throughout the mesentery of the duodenum and proximal third of the jejunum. All these glands showed varying degrees of pathological change; those nearest the central tumour were enlarged and enveloped in dense deep purple-coloured fibrous capsules enclosing masses of whitish opaque material of glue-like consistency, while the more distant glands, as in the mesentery of the jejunum, only revealed a simple enlargement without obvious macroscopic change.

While the left adrenal body appeared normal, the right adrenal had been converted into a lump the size and shape of a duck's egg, having an envelope almost blackened with altered blood encasing a brown softened caseous mass. The adjacent vena cava appeared unaffected.

The spleen was slightly enlarged. Its capsule was normal, but the pulp was of a deep purple colour, very soft and friable. Thrombosed splenic veins were obvious in cut sections. No nodules were observed in either the capsule or pulp though repeated cuts in all directions were made. The liver appeared normal in size, shape, colour, and consistency, but the individual lobules were abnormally distinct,

*From the Thompson Yates' Laboratory, The University of Liverpool.

resembling a pig's liver. The surface was smooth except where adherent to the stomach and colon. The organ was tough, and on cutting the surface the stroma stood out more prominently than is normal. No nodules were found in the liver substance. The hepatic duct throughout was normal. Beyond its adhesion to the liver the stomach showed no abnormality. The duodenum was grossly kinked by its dense adhesions to the surrounding viscera. With the exception of its first two inches, which were apparently normal the duodenum and first few feet of jejunum were deeply congested, and the lumen contained a quantity of brownish-black liquid, while the mucous lining had undergone rapid *post-mortem* changes. The remainder of the small intestine contained a slight amount of altered blood mixed with chyme. The large intestine contained some green coloured semi-solid fæces, but no blood. No other abnormalities were visible in the wall of the entire alimentary canal from the gastric cardia to the anus. The genito-urinary organs were negative.

Examination of the thoracic cavity revealed a complete transverse fracture of the left ribs from the 9th to the 14th inclusive, about two inches above each chondro-costal articulation. There was a diffusely spread, recent ante-mortem hæmorrhage into the regional intercostal muscles. The parietal pleura was not lacerated. There was no free fluid in the thorax, and no pleurisy. The right lung was healthy, while the left lung showed a diffuse hypostatic congestion. No trace of tuberculosis nodules was found after most careful examination.

The bronchial and mediastinal glands were enlarged and contained softened foci. The glands of head and neck, the trachea, the œsophagus, the nasal and buccal cavities were negative.

Nothing abnormal was observed in the pericardium, heart and great vessels, save that the right auricle and ventricle were full of *post-mortem* clot, while the left auricle was empty. The vertebral column and the long bones of the limbs were unaffected. Osteo-arthritic changes were present in the near hind stifle, hock and fetlock joints, also in the off-fore fetlock joint. Splints were present on the inner of both fore small metacarpals. The brain and cord were not examined.

(*b*) *Bacteriological.*—Direct films of the creamy contents of the mesenteric, mediastinal and right adrenal glands, also of scrapings from the cut surface of the pancreatic mass, revealed large numbers of Gram positive alcohol acid-fast bacilli having a beaded staining character.

Smears of spleen pulp and liver juice, also of jejunal contents after antiformin treatment, were negative for acid-fast bacilli. Inoculations into laboratory animals were not made.

(*c*) *Microscopic.*—Sections of the pancreatic tumour reveal two distinct varities of change—(a) large homogenous areas of general necrosis in the midst of which are varying sized collections of old caseous material; (b) areas of recent acute necrosis diffusely infiltrated with altered blood, in which the elements of the pancreas are still discernable as homogenous staining ghostly forms of their one-time marked differentiation. Scattered irregularly throughout these areas are collections of round cells, epithelioid cells and some fibroblasts. Tubercle bacilli are scattered diffusely throughout the sections.

The " tail " of the pancreas shows a rapid necrosis of the parenchyma spreading from the ducts. Massed within the ducts and spreading radially into the necrosed parenchyma are large numbers of Gram negative coliform organisms. No tubercle bacilli were present.

The liver shows degenerative changes in collections of hepatic cells either at the centre or periphery of lobules, while the stroma is thickened by newly-formed cellular fibrous tissue which extends into the peripheral zones of the lobules. Thus there is both degeneration of the parenchyma and complementary fibrous proliferation. No tuberculous nodules or tubercle bacilli are to be seen. Large numbers of Gram negative coliform organisms are to be seen along the course of the blood and lymphatic vessels.

The spleen shows pronounced recent congestion with thrombosis of the venous sinuses. There is no evidence of tuberculous foci.

The duodenum shows acute congestion with advanced *post-mortem* changes of the mucosa.

The sections of a thrombosed mesenteric vein, also of the thrombosed vessels in the organs described, reveal recently-formed laminated thrombi with no evidence of organisation from the walls.

Discussion.

The case presented a history of at least six months gradual but progressive wasting of an insidious onset; five weeks of constipation with anorexia, three weeks of asthenia, three days of acute abdominal crisis with intermittent fever, anæmia, and prostration.

In attempting to reconstruct the pathogenesis, one would postulate the primary focus as a tuberculous adenitis of the mesenteric gland or glands in the vicinity of the head of the pancreas.

The subsequent centrifugal lymphatic spread would result not only in the involvement of the mediastinal lymphatic system, which has direct anastomosis with the abdominal group, but also in a localised fibrous peritonitis.

Up to this stage it is conceivable that no symptoms would be manifested. However, the fibrous peritonitis would, by the dense deforming adhesions already described, lead to kinking both of the duodenum and colon, and thus by the interference with peristalsis result in impaction of the gut. In the meantime, the pancreas would become involved most probably by a direct extension of the tuberculous process from an adjacent mesenteric gland. The two distinct types of necrosis seen in the sections suggest that for some time the gland only contained scattered tuberculous foci, which, by their continual growth, would finally disorganise the functions of the gland ducts, resulting in the penetration into the

gland substance of the intestinal contents, as typified in the sections of the "tail." The trypsinogen coming into contact with its activating agent in the succus entericus would be liberated as trypsin, with consequent autolysis of the areas of healthy gland. With the onset of general autolysis both the blood and tubercle bacilli would rapidly diffuse throughout the gland parenchyma.

This sudden swelling from the hæmorrhagic infiltration of the pancreas and surrounding tissues would lead to constriction of the portal vein, resulting in thrombosis of the tributaries, which in turn would be responsible for the ascites, congestion of the spleen, duodenum, and first few feet of jejunum.

The early cirrhosis of the liver may have been due to the general toxæmia of the tuberculous process.

From the macroscopic appearances, the hæmorrhage resulting from the pancreatitis was confined by the adhesions and did not appear to have been profuse enough to have caused death. It would appear most probable that the manifestation of acute abdominal crisis coincided with the pancreatitis and portal thrombosis, which combined to produce fatal effects, either from shock or acute toxæmia.

The absence of tuberculous lesions throughout the alimentary tract does not invalidate the original premis, since both Chauveau and Dobroklowski have demonstrated that tubercle bacilli pass through healthy intestinal mucous membrane without causing any lesion of the structures of the wall. These and other numerous observations upon the absorption of pathogenic organisms through the intact intestinal mucous membrane are fully described by Calmette (1). Full enquiries as to the source of infection failed to produce any reliable evidence.

Chaussé (2) found between two and three hundred caseating tubercles in the pancreas of an ox affected with generalised tuberculosis.

Summary.—Death was due to acute hæmorrhagic pancreatitis secondary to intestinal tuberculosis.

REFERENCES.

(1) Calmette—*Tubercle bacillus infection and tuberculosis of man and animals* (English Ed.), 1923.

(2) Chaussé—"Tuberculosis of the pancreas in an ox" (Abstract), *Journ. Comp. Path. and Ther.*, 1911, xxiv., 372.

Rupture of the Diaphragm.

By J. McCUNN, M.R.C.V.S., West Ham.

The following reports of cases of ruptured diaphragm may be of interest. One would imagine that the condition would be of fairly frequent occurrence in our patients, but in the literature at my disposal apparently little notice is taken of it.

Case 1.—The subject was a pedigree dairy Shorthorn cow. The animal, which was out at grass, was noticed by the cowman to be staggering about, and as she had just calved he diagnosed "milk fever." He decided to get her home, and succeeded after much trouble. The distance covered was about three quarters of a mile, across fields. The man was proud of his feat and said that the cow repeatedly fell down and once turned a complete somersault. When seen at 3 p.m. the cow was in a loose box, down and evidently in the comatose stage of "milk fever." The udder was injected in the usual way and the patient was up again about 8 p.m. The owner saw her at this time and found that the animal had apparently recovered from "milk fever," but was in great respiratory distress, constantly straining, with the passage of small quantities of liquid blood-stained fæces. On arrival, I found that the animal had apparently recovered from "milk fever," and a complete change of symptoms was presented. There was great respiratory distress, with a respiratory rate of 60-70 per minute. The respiratory movements were short, laboured and shallow, with an unduly short and jerky expiration. The animal was standing in a slightly straddling position and the visible accessory respiratory muscles were seen to be well in action. The head was held well forward and there was a distressed look about the head and eyes. There was frequent straining, with slight eversion of the rectum and passage of small quantities of bright blood and mucus. The pulse was hard, wiry and irregular, with a rate of 85 per minute. Visible mucous membranes slightly injected and a temperature of 102°F. The condition was thought to be some thoracic lesion, and at first sight reminded one of an acute pneumonic condition. On examination, one noticed plenty of movement in the chest wall with no apparent difference on either side. On percussion, the right side gave a slightly tympanitic note when compared with the left side. Breath sounds were heard clear and distinct and with no adventitious sounds on the left side; on the right they were diminished and distant. There was no evidence of any pleural lesion. The heart sounds were heard clearly and distinctly with no adventitious sounds, the second sound being sharply accentuated.

On this picture, I ruled out ordinary thoracic lesions as commonly met with, but could not definitely arrive at a diagnosis. Sedatives were given, which eased the condition somewhat but the animal suddenly dropped dead three hours after my second visit.

On *post-mortem* examination I found an extensive rupture of the right half of the diaphragm involving both tendinous and muscular areas. The tear was eight inches long, with a ragged hæmorrhagic edge. Protruding into the thorax was part of the rumen, packed with ingesta, which was withdrawn with some difficulty. There was little hæmorrhage, considering the size of the tear, this being probably due to the herniated rumen acting as a plug. The blood passed per rectum evidently came from the rectum, as this part of the intestine was intensely congested, with the mucous membrane swollen and covered with blood-stained mucoid material.

Case 2 was an aged vanner gelding, which I saw at a knacker yard. The animal had been at work for its owner for three or four years. It was broken

winded when he purchased it, and of late its condition had got worse. It was sent to be killed by a lady who had purchased it, because she thought it was too old to work. It was at work right up to the day of slaughter.

Post-mortem revealed a hernia of the right dome of the diaphragm in the tendinous part. The hole was 4in. by 2in. in its widest part. It had a well-defined, smooth, rounded, tendinous edge and was obviously an old lesion. Through the hole there protruded a loop of intestine which, at its extremity, was firmly attached to the seventh rib just above the costo-chondral junction. On separating this loop, it was seen that the site of attachment was the seat of an old completely healed fractured rib.

I could elicit no history of any accident sufficient to cause the injury, and it seemed to me remarkable that an animal could carry on and do useful work after such an injury with only the disadvantages one usually ascribes to "emphysema."

In the smaller animals one often sees cases of ruptured diaphragm but, in my own experience, I have only seen it in connection with other injuries which have in themselves been considerable.

A Prescription for increasing the Quantity of Milk in Cows.

By V. P. GOKHALE, G.B.V.C., Veterinary Inspector, Perak, Federated Malay States.

PRACTICE *versus* THEORY.

As far as I am aware, no specific or any special drugs are prescribed for increasing the quantity of milk. Wallis Hoare in *Veterinary Therapeutics* writes on Galactagogues:—"There are no drugs which are of practical value in this respect. Jaborandi increases the secretion of milk, but only in a temporary degree, and is not employed as a galactagogue. A healthy condition of the dam and good feeding are necessary for the production of milk, and a liberal milk diet assists lactation in animals nursing their young." (Third edition.)

I have tried the following prescription in four cases with success:—

℞ Tinct. jaborandi, 1oz.
Tinct. nux vomica, ½oz.
Water, 1 pint.
M. ft. haust.
Sig.—To be given morning and evening for ten days.

The cases I treated had no trouble with their udders and were in good condition. The complaint in these cases was that the cows gave scanty milk and two of them would not even allow the calves to suckle. Under the above treatment within less than a week the quantity of milk was appreciably increased and remained so for some months. No special diet or any change in diet was ordered.

I hope the profession will give a fair trial to the above prescription, when there is an opportunity, in those cases not due to diseased condition of the udder, and publish the results. If the diminution in quantity of milk is due to poor appetite and condition that, of course, should be corrected first and also attention should be paid to diet.

DIVISIONAL REPORT.

North of England Division.*

A meeting of this Division was held on 30th May, 1925, in the Mayor's Chamber, Durham.

In the absence of the President, Mr. C. Elphick occupied the chair, and there were present Messrs. F. A. Davidson, Howie, H. S. Elphick, Starkey, Thompson, Hill, Peele, Wilkinson, Blackburn, T. M. Mitchell, and J. R. Rider, Hon. Secretary.

Visitors.—Dr. H. Smith, Durham; Messrs. Allan, Birmingham; Ollerhead, Darlington; and W. Jackson Young, Ministry of Agriculture.

Apologies were read from the President, Messrs. J. H. Taylor, Doughty, Gibson, Parker, Snaith, J. W. Rider, J. Davidson, A. Gofton (President, N.V.M.A.), Drs. Mostyn, M.O.H., Wormald (Darlington), Hill (M.O.H. for the County), Stuart (M.O.H. for the City of Durham), and Mr. C. Stock, County Analyst.

The minutes of the previous meeting were taken as read and confirmed.

Letters returning thanks for sympathy extended by the Association were read from Mrs. Dudgeon, Messrs. J. H. Taylor and W. Dotchin.

Obituary.—The chairman explained that the Association had already offered its sympathy to those recently bereaved, but he was sure the members would wish to record the sense of their loss, and he moved a formal vote of condolence with the relatives of the late Messrs. G. R. Dudgeon, C. E. J. Meikle and J. T. Taylor. The vote was carried, the members standing in silence.

Election of New Members.—Messrs. T. Parker, D. Starkey, and R. S. Wilson, were unanimously elected members of the Association.

REPORT OF COUNCIL MEETING.

The Council considered correspondence from the N.V.M.A. referring to:

(*a*) Scale of minimum fees for Veterinary Inspectors. It advised that no action be taken, in accordance with the covering letter from the General Secretary.

(*b*) Memoranda on the Tuberculosis Order and Meat Inspection.

The council expressed its appreciation of the action of the N.V.M.A. as indicated in these memoranda.

Resolution from the Central Division by Major General Sir J. Moore *re* the establishment of a Veterinary Research Council.

The Council strongly advised the support of this effort to secure a Veterinary Research Council, as indicated in the resolution. It was of the opinion that such a council would lead to progress by co-ordinating the studies and experiences of the various workers; to the great benefit of the stockowner and the public generally.

Garnett Memorial Fund.—The Council advised the acceptance of the invitation to the President and Secretary to become members of the committee, and commended the fund to the support of the members.

*Received on June 9th, 1925.

Elections.—The Council advised the following.

1. Hon. Auditor, *vice* the late Mr. G. R. Dudgeon, Mr. H. Hicks, West Hartlepool.

2. To the Council N.V.M.A., Major H. Peele, with the Hon. Secretary ex-officio.

3. To the Council of the Victoria Veterinary Benevolent Fund, the Hon. Secretary.

Finance.—The Council advised that one represent tative from the Association should attend each meeting of council of the National, and that he be allowed train fare, and a subsistence allowance not exceeding 15s. per night.

The Council sought authority to open a banking account in the name of the Division.

Arrears of Subscriptions.—The Council regretted to report that, although efforts had been made to collect the arrears, only three members had responded. It felt that members did not appreciate the need for active support of the Division both financially and otherwise, and proposed to increase its efforts with regard to those members still remaining in arrears.

August Meeting.—The Council advised that the meeting be held on 8th August, at Alnwick, so as to avoid the annual meeting of the "National." Professor J. B. Buxton had promised to give a paper on, and a demonstration of, the intradermic tuberculin test.

The report was received and adopted on the motion of Mr. PEELE, seconded by Mr. F. S. DAVIDSON.

Fees for Colliery Contracts.—Mr. C. ELPHICK stated that his firm had been approached by a certain colliery company with reference to a reduction of the charges. He was anxious to have a decision, which would be binding, from the Association. After some discussion the meeting decided that at present no reduction in the existing fees should be made.

Mr. F. A. DAVIDSON, B.Sc., then read his paper on Milk. (This paper, and the discussion which followed, are reproduced elsewhere in this issue.—Ed.).

Any other Business.—Appreciative reference to the action of the N.V.M.A., in suggesting to the Mines Department the need for a Chief Veterinary Officer, was made by the CHAIRMAN. He was sure that the appointment of a veterinary officer to advise the Mines Department on all questions relating to the employment of horses underground would be welcomed by those engaged in this work. He proposed the following resolution :

> "That this Association welcomes the action of the N.V.M.A., in suggesting to the Mines Department the necessity for the appointment of a Chief Veterinary Officer, to advise the Department on all questions relating to the employment of horses underground.
>
> It offers its warmest support to the proposal, and hopes that if and when such an appointment is made, the N.V.M.A. will be consulted."

Mr. PEELE, in seconding, said he felt he was expressing the view of all members engaged in colliery practice, when he said that the appointment of a Chief Veterinary Officer was long overdue.

The resolution was carried unanimously.

(Continued at foot of next column)

NOTES AND NEWS.

The Editor will be glad to receive items of professional interest in these columns.

Diary of Events.

July 9th—Central Division, Summer Outing.
July 15th—Meeting of the West of Scotland Division.
July 16th—Meeting of the Western Counties Division at Torquay.
July 17th—Meeting of the Mid-West and South Wales Division at Newport.

The following extracts from a letter received by Mr. Jas. Conner, of Aberdeen, from the Superintendent of the Cleansing Department of the Corporation of Glasgow, will no doubt be of interest to our readers :

"With regard to upkeep of vehicles, I would point out that the figure of £15 per annum for repairs is quite a fair estimate. In this connection it must be borne in mind that the vehicle is a four-wheeled waggon, weighing 22 cwts., with a capacity of $5\frac{2}{3}$ cub. yds., whilst the loads vary from 28 cwts. to 50 cwts., the average load being 35 cwts.

"As you are aware, tenement properties predominate in Glasgow, and it is the duty of the Corporation to remove the refuse from the back courts, which means that the material has to be carried a distance of approximately 35 yards.

"For heavy carting work within, say, $1\frac{1}{2}$ to 2 miles radius, the horse is still the most suitable as well as the most profitable method of transport, and I am satisfied that horse haulage will continue to maintain that position within the radius referred to. So far there is no mechanical vehicle on the market that can compare with the horse for short distance haulage.

"The home breeder, however, must see to it that the proper type of horse is bred for the work. I have at the moment under my charge 320 animals, and to maintain the stud at the right level it is necessary to purchase about 40 horses per annum. In making my renewals I find it is extremely difficult—and becoming more so each year—to secure the right type of heavy draught horse for heavy haulage work, and my experience is common to other large buyers, who are periodically on the look out for the class of animal I have indicated."

ALTERNATIVE POLICY FOR SHEEP SCAB.

Intimation was made at a recent meeting of the Perthshire Local Authority that the Ministry of Agriculture have in contemplation a new policy for dealing with sheep scab.

Mr. T. B. Marshall (clerk) stated that he had received from Mr. A. N. Skelton, M.P. for Perth Division, a letter sent to him by the private secretary to the Minister of Agriculture, in which it was stated that the Ministry had for some time past been engaged in devising some alternative policy for dealing with sheep scab. An order was now being drafted with the view of giving effect to the new

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(Continued from previous column.)

The revision of rules was remitted to the Council for its consideration and report.

Votes of thanks to the Mayor of Durham for the use of his hall, to Mr. Davidson for his paper, and to the chairman, terminated the business of the meeting.

J. R. RIDER,
Hon. Secretary.

proposals. It was impossible, however, for these to be put into operation during the current season, and it was proposed to submit the draft order for the consideration of local authorities and agricultural organisations in due course with a view to its adoption for a concerted effort against scab in 1926.

The new scheme would obviate the necessity for the continuance of regulations of local authorities which had been found to interfere seriously with the course of the sheep trade. It was not, however, considered opportune to interfere with the present powers of local authorities to make regulations until the new order could be brought into operation.

A medical correspondent to the *Sunday Times*, says:—

"For the past fifteen years Dr. Albert Calmette, the well-known worker at the Pasteur Institute, has been conducting researches with a view to the discovery of an effective vaccine for tuberculosis.

"Certain of his work in this direction, in which Dr. C. Guerin has collaborated, has been published at intervals in France and also in this country, so that the paper which he read last week before the French Academy of Medicine, in which some very definite results were claimed, was naturally accorded close attention as the outcome of a protracted period of investigation.

"The bilié-Calmette-Guerin vaccine, known as b-C-G, is obtained by cultivation in glycerinated bile, by which it acquires particular physiological characters, resulting in a progressive loss of virulence. In calves massive injections produced only temporary effects, while small injections made the animals resistant to intravenous inoculation with virulent bacilli, facts indicating alike the safety and the efficacy of the procedure.

"The joint observations of Dr. Calmette and Dr. Guerin have been recorded from time to time in the bulletins of the Académie des Sciences and in the Annales of the Pasteur Institute, and the character of the work was such that the audience at the Academy of Medicine were not surprised to learn of the strong claims made for the vaccine as a preventive of tuberculosis among newly-born children placed in a dangerous environment.

"It would not be safe to claim as yet any higher virtues for b-C-G vaccine."

ERRATA.

The meeting of the Western Counties' Division on July 16th next, was erroneously announced in our Diary of Events last week as due to take place at Truro. The meeting will be held at Torquay.

In the article "Poisoning by the Aconite Plant," by Mr. H. Taylor, which appeared in last week's *Record*, for the sentence "that the absorption took place," *read* "that NO absorption took place."

CORRESPONDENCE.

The Annual Meeting of the R.C.V.S.

TO THE EDITOR OF THE VETERINARY RECORD.

Sir,—With all due deference to Messrs. Hobday and Spencer's opinions *re* above, thank you for your Editorial article. If there is any extenuating circumstance let us have it. Some folks do not like a little criticism. I am sorry to say that it does not say much for the *Vis Unita Fortior* of the Profession or its Council that there should have been such a meagre attendance at the presentation of an Honorary Diploma to such a distinguished officer of the army.—Yours faithfully, A. RIDLINGTON.

Ramsey, Hunts.

Practitioners and the Alsatian.

TO THE EDITOR OF THE VETERINARY RECORD.

Sir,—I have just read in the current *Record* your reprint from the *Alsatian Magazine*. I am astonished to find (if true) that so many veterinary surgeons fight shy of Alsatians. A considerable number come into my kennels and I visit a number. They are certainly a bit sensitive and suspicious, but with gentle handling and talking I find no difficulty with them at all; they are easy to treat and dose and make very good patients—much better, indeed, than some of the smaller breeds. I do not think the correspondent in the *Alsatian Magazine* need have any fear of what the "county vet." would do or say. He would get on with the job. Alsatians may be treated exactly the same as other large dogs. Yours faithfully, W. KNIGHT BARRON, Major.

Newbury, Berks.,
June 27th, 1925.

Aconite Poisoning.

TO THE EDITOR OF THE VETERINARY RECORD.

Sir,—The interesting clinical note by Mr. Henry Taylor *re* the above in your current issue, prompts me to ask whether the prominent symptom simulating choking and attempted vomition noticed in the case, is really a physiological result of *absorption* of the poison from the stomach *or* intestine, or is it a local effect of the acrid plant, acting upon the pharynx and epiglottis? To put the question another way; if a poisonous dose of aconite be given to a horse, say in a gelatine capsule, will the same symptoms develop? Mr. Taylor gives the added weight of italics to his statement of the fact that the symptoms of vomition and gulping appeared *a quarter of an hour after eating the leaves*, and I would suggest that herein lies the proof of my submission, that this symptom is not one of systemic aconite poisoning by absorption from the intestinal tract or stomach, but is a local effect of the acrid nature of the plant, or that the active principle is absorbed locally, and exerts an irritant and paralytic effect upon the pharynx and epiglottis.

I make this submission with the greater confidence, because I once "poisoned" myself in exactly the same way, and with the same unpleasant results. When a student at Edinburgh, and very keen on botany, I spent an afternoon in the Botanical Gardens, where special plots were laid out with various poisonous plants. Book in hand, I lay on the grass near a fine specimen of *Aconitum napellus* in flower, and with the inconsequence and incredulousness of youth, pulled off a small fragment of a leaf of the plant, put it in my mouth and started to chew it. Almost immediately I was conscious of a smart tingling of my lips and tongue, and spat the débris out, but the sensation continued, and intensified to a burning feeling, with a profuse flow of watery saliva. I avoided swallowing as far as possible, but was compelled to "gulp" repeatedly, and now had a sensation of choking, which made me "retch" and "gulp" again. In a mild panic now, I knocked at the door of the park-keeper's lodge, and for the next hour sat in his house with my head down and mouth open, and was continually taking sips of cold water to allay the burning and choking sensation in mouth and throat.

That evening and most of the next day there was an intolerable sense of dryness of the mouth and pharynx, and I had to be careful in swallowing food, except of a sloppy character.

Long years after this experince, I found precisely the same symptoms following the administration to horses of 10 minims of Tr. aconite (Fleming) in 1½ pints of cold water as a constituent of a colic draught. These horses were bad to drench, and refused to swallow readily, thus allowing the aconite to exert its local effect.

The treatment was, allowing cold water to drink, and an electuary of bismuth carb. made with finest olive oil, as I feared it would be dangerous to attempt drenching, and also did not consider there was any systemic poisoning to combat.

If anyone is sceptical as to the effect of chewing a little bit of the leaf of *Aconitum napellus*, let him try the experiment, but I warn him he is in for a nasty time unless he has a cast-iron throat.—Yours faithfully, EDWD. P. EDWARDS, M.R.C.V.S.,

Mold.

Lamb Dysentery.

TO THE EDITOR OF THE VETERINARY RECORD.

Sir,—Further to my communication which appeared in the *Veterinary Record* of June 6th, I enclose a copy of a letter from the *Newcastle Daily Journal and Northern Star*,

of May 7th. It was written by a well-known veterinary surgeon whose experience of lamb dysentery cannot be called in question, and it tends to lend support to the views which I have expressed.—I am, Sir, Yours faithfully,
T. J. BOSWORTH,
Institute of Animal Pathology,
Field Laboratories,
Milton Road, Cambridge,
26th June, 1925.

The communication forwarded by our correspondent is as follows:—

"Mr. H. McD. Paul, M.R.C.V.S., Glanton, Northumberland, writes:—

"In your issue of May 2 I noticed a lengthy article on Lamb Dysentery by Mr. S. H. Gaiger, F.R.C.V.S., of the A.D.R.A., Glasgow.

"Three organisms he claims as being the direct and indirect causes of the disease; then he proceeds to theorise as to the mode of entrance into the body of the patient. I use the word theorise purposely, as he has never proved conclusively, to my mind, that he had any right to assume his deductions and broadcast them on the very limited data at his disposal.

"He takes great exception to the method, adopted generally in Northumberland, of twinning on lambs. He does not tell us how this most essential (shall I say pastime?) has to be performed. I presume he expects the shepherds to turn away the ewes, who have already lost their lambs, instead of making things easier for those ewes which happen to be nursing twins.

"Personally, I am satisfied that the disease is neither infectious nor contagious. This may appear a sweeping statement to the uninitiated, but I am happy to say I can prove it to the absolute satisfaction of all interested.

"I hold that it has never been proved that lambs are born free of the disease, and I absolutely disagree with my friend on this point. I hope in the near future to satisfy Mr. Gaiger that his theorising has led him astray.

"He tells us that it takes 15 years for all sheep stock on infected farms to become immune, and that there is a great tendency to clean farms becoming infected.

"I admit the latter fact, but my friend does not say how the clean farms become infected. Is it by the passage of infected stock? If so, I am of the opinion that this theory will not hold good.

"The treatment of infected or newly born lambs with an anti-serum is, in my opinion, useless, and a waste of time to those who at this time of year are slaving day and night. The same applies to the so-called sanitary measures.

"I have yet to learn of a more hygienic lambing ground than the Cheviots, or yet a cleaner or more educated class of workman than our head shepherds. They see things done in a practical, clean way, and I can assure your contributor that such has always been the case in this country.

"Lastly, I must again disagree with Mr. Gaiger in his statement that lamb dysentery is thoroughly understood. It is not, and will not be, until such time as it can be produced experimentally:—(1) Until the true source of infection, contagion or heredity has been proved up to the hilt; (2) the part played by the tup; (3) the part played by the ewe; (4) the part played by the soil; and (5) the dozen and one points which crop up in regard to this disease which still require explaining away."

Horse Transport Superiority and present Civil and Military Requirements.

TO THE EDITOR OF THE VETERINARY RECORD.

Sir,—I hasten to amplify my letter of the 26th instant and enclosure from Mr. W. Greig, confirming my previously expressed opinion that not only was the superiority of horse transport unrecognised generally, but also that there existed, at present, a shortage of the types of horses which are urgently required to fulfil the demand which this superiority has made and will maintain.

It is remarkable to me how cursorily this glaring necessity and insufficiency have been allowed to pass for so long unnoticed, in double-harness, and I take this opportunity of adding my light tenor to the tones of muffled bass, which are also proclaiming the dread of the want, and the urgency of the need for supply.

In the letter enclosed for publication herewith (see "Notes and News"—Ed.), you have the considered opinion of one in a position to know, who states emphatically that in the heart of our Clydesdale country, where the draught-horse produced has been the admiration of the world, he cannot, at the extraordinarily good price of £100 per head, be supplied with the desirable and satisfactory type, for the comparatively light duties required under the most ideal conditions.

Also, in his article quoted in the *Veterinary Record* of 6th instant, he justifies his contention that the superiority of his Department over that of other cities or towns in Scotland and England in the matter of results from horse haulage, is due to the even comparatively indifferent horse with which he must be satisfied to-day. Surely no better supporting evidence can be required of the need for good, heavy horse. The majority of other towns and cities require stronger and heavier horses than Glasgow—cleanly-bred draught horses—and the attractive prices should justify the enterprise of the breeder accordingly.

Take, also, our lighter breeds, particularly the light-draught horse, which may, according to weight and character, comprise the light heavy-draught, the gunner, the heavy or light cavalry, and the weight-carrying hunter.

This class of animal is urgently needed in all the larger cities and towns, for lighter draught and quicker delivery purposes. His adaptability makes him equally at home behind a load singly, in a team, or in plough or harrow. Again, he will, on occasion, take his seventeen stone load on his back and get a stiff country.

This extends my field of observation to the sphere in which this class of horse has always excelled, in which he has always been necessary, and never so much so as to-day. I refer you to the following words, few in number, yet conveying such a wealth of wisdom, and so pithily extolling and expressing the need for the horse. "To equip our light troops properly, mounted troops and mounted artillery, that we may take advantage of these modern weapons." These are the words of our greatest soldier, Field Marshal Earl Haig, spoken at our meagrely-attended Annual Meeting on June 4th. Where were the horses of that type and in the number required before? Where are they now? The Army in the Field of the future will consist of men on horses, cavalrymen and artillerymen. The demand is evident, similarly the lack of supply lamentable. Twenty thousand horses of this class would be absorbed in Great Britain right away, and the supply might be repeated every three months for a year, and more. One does not expect rhetorical enthusiasm from our great soldier leaders in advertising the present national requirements in the matter of horse-flesh; and I would refer to his concluding sentence that it may be read again: "We can do a great deal if we only ponder over the lessons of *that* time. We can do a great deal to improve our organisation at present, and *lay the seeds for future successes*, when the necessity arises."! Let me refer, in conclusion, to the remarkable fact that only in those theatres of the late war where our Army's tactics and composition were on the lines already designated, were we able to bring our operations to a successful conclusion in the Field.—Yours faithfully, JAS. CONNER, Capt., M.R.C.V.S.,
34 Loanhead Terrace,
Aberdeen,
June 27th, 1925.

Errata.—In the letter from Mr. Conner upon this subject published in the issue of June 20th, in line 12, for "costing" read "casting," and in line 28, for "sight" read "size."

National Veterinary Medical Association of Great Britain and Ireland.

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Cheques should be made payable and all communications sent to the General Secretary at the Offices of the Association, 10 Gray's Inn Square, London, W.C.1.